

WHAT IS CLAIMED IS:

1. A microphone array system including a plurality of microphones and a signal processing unit, comprising:
  - at least one microphone arranged along each axis direction; and
  - a received sound signal processing part for performing processing of sound signals received at the plurality of microphones, having a directional sound signal calculating function, which is essential, for estimating a directional sound signal to an arbitrary direction based on the received sound signal with a unidirectivity or bidirectivity pattern along each axis direction, and further having at least one function of other sound signal processing functions at the same time; wherein

the plurality of microphones are unidirectional microphones, a first unidirectional microphone is directed to a positive direction on a first axis, and second and third unidirectional microphones are directed to positive and negative directions on a second axis that is orthogonal to the first axis, and

the received sound signal processing part has a function for calculating a directional sound signal to an arbitrary direction based on a unidirectional received sound signal to a positive direction on the first axis and a bidirectional received sound signal to positive and negative directions on the second axis.
2. The microphone array system according to claim 1, wherein the received sound signal processing part has a sound source direction detecting function for detecting a sound source direction, using a power in each axis direction of a sound signal calculated by the directional sound signal calculating function and a cross-correlation thereof.

3. The microphone array system according to claim 2, comprising the directional sound signal calculating function and the sound source direction detecting function at the same time, specifying a direction of a speaker by the sound source direction detecting function, calculating a directional sound signal to the direction of the speaker by the directional sound signal calculating function and performing desired sound enhancement processing to enhance the voice of the speaker in an arbitrary direction dynamically.

4. The microphone array system according to claim 3, comprising a movable camera, wherein an improvement for a directivity of a received sound signal to an image capturing direction of the movable camera and an improvement for a directivity of a received sound signal to a sound input from an operator of the movable camera are switched for implementation, using the directional sound signal calculating function and the sound source direction detecting function at the same time.

5. A microphone array system including a plurality of microphones and a signal processing unit, comprising:

at least one microphone arranged along each axis direction; and  
a received sound signal processing part for performing processing of sound signals received at the plurality of microphones, having a directional sound signal calculating function, which is essential, for estimating a directional sound signal to an arbitrary direction based on the received sound signal with a unidirectivity or bidirectivity pattern along each axis direction, and further having at least one function of other sound signal processing functions at the same time;  
wherein

the plurality of microphones are at least one unidirectional microphone and at least one bidirectional microphone, the unidirectional microphone is directed to a first axis direction, the bidirectional microphone is directed to a second axis direction that is orthogonal to the first axis direction, and

the received sound signal processing part has a function for calculating a directional sound signal to an arbitrary direction based on a unidirectional received sound signal to a positive direction on the first axis and a bidirectional received sound signal to positive and negative directions on the second axis.

6. The microphone array system according to claim 5, wherein the received sound signal processing part has a sound source direction detecting function for detecting a sound source direction, using a power in each axis direction of a sound signal calculated by the directional sound signal calculating function and a cross-correlation thereof.

7. The microphone array system according to claim 6, comprising the directional sound signal calculating function and the sound source direction detecting function at the same time, specifying a direction of a speaker by the sound source direction detecting function, calculating a directional sound signal to the direction of the speaker by the directional sound signal calculating function and performing desired sound enhancement processing to enhance the voice of the speaker in an arbitrary direction dynamically.

8. The microphone array system according to claim 7, comprising a movable camera, wherein an improvement for a directivity of a received sound signal to an image capturing direction of the movable camera and an improvement for a directivity of a received sound signal

to a sound input from an operator of the movable camera are switched for implementation, using the directional sound signal calculating function and the sound source direction detecting function at the same time.

9. A method for performing sound processing using a microphone array system including a plurality of microphones and a signal processing unit, wherein at least one microphone is arranged along each axis direction,

the method comprising:

an operation for performing processing of sound signals received at the plurality of microphones, wherein the received sound signal processing operation includes calculating a directional sound signal to an arbitrary direction based on the received sound signal with a unidirectivity or bidirectivity pattern along each axis, which is essential, and further performing at least one function of other sound signal processing functions at the same time;

wherein the plurality of microphones are unidirectional microphones, a first unidirectional microphone is directed to a positive direction on a first axis, and second and third unidirectional microphones are directed to positive and negative directions on a second axis that is orthogonal to the first axis, and

the received sound signal processing operation includes calculating a directional sound signal to an arbitrary direction based on a unidirectional received sound signal to a positive direction on the first axis and a bidirectional received sound signal to positive and negative directions on the second axis.

10. A method for performing sound processing using a microphone array system including a plurality of microphones and a signal processing unit, wherein at least one microphone is arranged along each axis direction,

the method comprising:

an operation for performing processing of sound signals received at the plurality of microphones, wherein the received sound signal processing operation includes calculating a directional sound signal to an arbitrary direction based on the received sound signal with a unidirectivity or bidirectivity pattern along each axis, which is essential, and further performing at least one function of other sound signal processing functions at the same time;

wherein the plurality of microphones are at least one unidirectional microphone and at least one bidirectional microphone, the unidirectional microphone is directed to a first axis direction, and the bidirectional microphone is directed to a second axis direction that is orthogonal to the first axis direction, and

the received sound signal processing operation includes calculating a directional sound signal to an arbitrary direction based on a unidirectional received sound signal to a positive direction on the first axis and a bidirectional received sound signal to positive and negative directions on the second axis.